

## **BIOC12H: Biochemistry I: Proteins and Enzymes Fall 2018**

### **Description**

This course will cover the general structure and function of macromolecules in living organisms. However, the focus will be on the structure and function of proteins and the special class of proteins: enzymes. Analytical methods for proteins will also be discussed. Topics include: amino acids; the primary, secondary, tertiary and quaternary structures of proteins; protein motifs and protein domains; glycoproteins; membrane proteins; classical enzyme kinetics and allosteric enzymes; mechanisms of enzyme action.

**Prerequisites:** CHMB41 and [BIOB10H & BIOB11H] /BIOB10Y

### **Class Meetings**

Monday 13:00-15:00 SY110

Wednesday 11:00-12:00 IC130

### **Instructor**

Dr. Rongmin Zhao

Office: SY248

Email: [rzhao@utsc.utoronto.ca](mailto:rzhao@utsc.utoronto.ca)

Please use E-mail ONLY when it is critical for you to get in touch with me and use BIOC12H-Biochemistry in the subject line. Your student name and student number must be included in your email.

### **Office Hours**

Instructor office hours (SY248):

Monday 3:00-5:00pm; or the time by appointment

### **Teaching Assistant**

We have two teaching assistants, Kathy Miao ([kathleen.miao@mail.utoronto.ca](mailto:kathleen.miao@mail.utoronto.ca)) and Bona Mu ([bona.mu@mail.utoronto.ca](mailto:bona.mu@mail.utoronto.ca)). TA monitors the online homework given in **Smartwork 5**, and the Bulletin board on **Quercus**. TA will also hold office hours after term tests to answer questions. The schedule of TA office hours will be announced on the course website.

### **Lecture Materials**

The University of Toronto QUERCUS system will be used to support the course. You can log in from the website [q.utoronto.ca](http://q.utoronto.ca) with your UTORid. Lecture note will be posted online prior to the lecture week either Friday or Saturday. However, lecture notes only allow you to follow the lectures easily, and some materials discussed in class may not be included in lecture notes. Any important information related to this course will be announced online and you are supposed to check the announcement regularly.

## Textbooks

Biochemistry by Roger L Miesfeld & Megan M McEvoy (W.W.Norton & Company). The Canadian bound paperback copies were ordered and available from the UTSC bookstore. The textbook comes with the following if you purchase a copy:

- **720 day access** to all digital resources, including the ebook, *Smartwork5 homework system*, 3D molecular, and process animations, etc...
- An **integrated student solutions manual** which will bring in over 100 pages of long form student solutions.

The purchase of the textbook is not absolutely required, but it is highly recommended. We'll use *Smartwork5 homework system* accompanied with the textbook for extra suggested questions. Smartwork 5 homework system is different from Quercus to which everyone enrolled in this course will have full access. See posted guideline on how to access and use the Smartwork 5 from the website: <https://digital.wwnorton.com/biochem>. You are required to sign up with your UofT student email address. Everyone could sign up the online homework system by choosing "I want to sign up for free trial access" which let you to access the system for 21 days. See the following evaluation section for **bonus marks** if finishing Smartwork 5 questions.

**Alternative readings:** many other biochemistry textbooks cover similar topics, and they all provide valuable explanation on protein biochemistry concepts. These textbooks include but not limited to Biochemistry: the molecular basis of life (McKee and McKee); Biochemistry (Voet et al.); Biochemistry (Berg et al.); Principles of Biochemistry (Horton or Moran et al.); Biochemistry (Garrett et al.)

However, **ONLY** materials covered in class or those assigned for reading will be tested.

## Course Evaluation

There are two term tests and one final examination; all are close book tests.

Term Test 1: 20%

Term Test 2: 30%

Final examination: 50%

***Smartwork 5 homework: 6% (Bonus)***

All tests focus on concepts and the mechanism of processes. The test may include calculation and graphing questions, explanation of processes and interpretation of terms.

**Term Test 1:** First term test covers materials likely from the first three lectures. The test will be in the format of multiple choice and short answer questions. It is a 2-hour test probably during the 5<sup>th</sup> week. The exact time, location and coverage will be announced later.

**Term Test 2:** Test materials cover likely Lectures 4-7. But it depends on the test date that will be announced later. It is also a 2-hour test and takes multiple choice and short answer questions.

**Policy on Term Tests:** Term tests are closed book tests. Although term test 2 covers materials for lecture 4-7, you must understand that, to properly answer questions in Term Test 2, you need the

knowledge from previous lectures. There is no makeup for term tests. If you miss a term test due to sickness, you have to contact the Departmental Undergraduate Coordinator (**Jennifer Campbell, [jacampbell@utsc.utoronto.ca](mailto:jacampbell@utsc.utoronto.ca)**) and she will determine whether you have the legitimate cause to miss the test. If you have a valid reason to miss term test 1, the 20% weight will be combined to the second term test. If you have a valid cause to miss the second term test, the 30% weight will be combined to final exam. Missing both term tests is not allowed and if this happens even both with a legitimate reason, term test 1 will be treated as 0 and only the weight of second term test will be combined to the final exam.

**Note:** Because suggested Smartwork questions are bonus only, there is no makeup or any policy to grade late submission. Unfinished Smartwork questions by due date, for whatever reason, will not be marked or recorded.

**Final exam:** Schedule of the final exam will be arranged by the Registrar's office. The format will be similar to term tests but will be cumulative. It will cover materials from the beginning. However, emphasis will be on materials from lecture 8 to lecture 12. Students who miss the final exam must contact the Registrar's Office for appropriate arrangement.

### **Information Regarding AccessAbility Services at UTSC**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to contact with me and/or the AccessAbility Services Office as soon as possible. The UTSC AccessAbility Services staff (located in Room SW-302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. You can contact AccessAbility Services at 416-287-7560 or [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca).

### **Academic Integrity**

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- **IN PAPERS AND ASSIGNMENTS:** Using someone else's ideas or words without appropriate acknowledgement; submitting your own work in more than one course without the permission of the instructor; making up sources or facts. Obtaining or providing unauthorized assistance on any assignment.
- **ON TESTS AND EXAMS:** Using or possessing unauthorized aids; looking at someone else's answers during an exam or test; misrepresenting your identity.
- **IN ACADEMIC WORK:** Falsifying institutional documents or grades; Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to

seek out additional information on academic integrity from your instructor or from other institutional resources (see <http://www.utoronto.ca/academicintegrity/resourcesfor students.html>).

### Tentative Lecture Schedule

Topics covered are listed below. This is a tentative schedule and the order may be changed later without notice. Lecture notes will be posted weekly.

Lecture weeks	Monday of the Week	Topics	note
	Aug 31		Course syllabus and Lecture note one posted
1	Sept 3	Introduction, basics of biochemistry, water, buffer, pH control, thermodynamics	First class on Sept 5 <sup>th</sup> . Please double check your prerequisite for this course
2	Sept 10	Amino acids, protein primary structure	Sept 15, last day to add F and Y courses.
3	Sept 17	Protein secondary structures	
4	Sept 24	High orders of protein structures	
5	Oct 1	High order of protein structures, protein analysis	
	Oct 8	Reading week (No class)	Oct 8-Thanksgiving Day and reading week.
6	Oct 15	Protein folding and diseases	<b>Term test 1</b>
7	Oct 22	Important proteins	
8	Oct 29	Carbohydrate and glycoproteins	
9	Nov 5	Lipid and membrane proteins	<b>Term test 2</b>
10	Nov 12	Enzyme kinetics	Nov 19, last day to drop F courses without academic penalty
11	Nov 19	Mechanism of action of Enzymes	
12	Nov 26	Regulation of enzyme activity	
13	Dec 3	Last class for this course	
	Dec 5-20	Final examination period	<b>Final exam is cumulative</b>